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PNP 2019-010

February 28, 2018

10 CFR 50.73

ATTN: Document Control Desk
U. S. Nuclear Regulatory Commission
Washington, DC 20555-0001

SUBJECT: LER 2019-001-00 - Reactor Protection System and Auxiliary Feedwater System Actuation due to Turbine Governor Valve Failure

Palisades Nuclear Plant
NRC Docket 50-255
Renewed Facility Operating License No. DPR-20

Entergy Nuclear Operations, Inc., hereby submits the enclosed Licensee Event Report (LER), 2019-001-00, for the Palisades Nuclear Plant. The LER describes a manual actuation of the reactor protection system and an automatic actuation of the auxiliary feedwater system. The occurrence is reportable in accordance with 10 CFR 50.73(a)(2)(iv)(A).

This letter contains no new commitments and no revisions to existing commitments.

Should you have any questions concerning this report, please contact Mr. Jeffery Hardy, Regulatory Assurance Manager, at (269) 764-2011.

Respectfully,

JAH/mrp

Enclosure: LER 2019-001-00, Reactor Protection System and Auxiliary Feedwater System Actuation due to Turbine Governor Valve Failure

CC Administrator, Region III, USNRC
Project Manager, Palisades, USNRC
Resident Inspector, Palisades, USNRC

ENCLOSURE

PNP 2019-010

LER 2019-001-00, Reactor Protection System and Auxiliary Feedwater System Actuation Due to Turbine Governor Valve Failure

3 Pages Follow

NRC FORM 366 (02-2018)

U.S. NUCLEAR REGULATORY

LICENSEE EVENT REPORT (LER)

(See Page 2 for required number of digits/characters for each block)

(See NUREG-1022, R.3 for instruction and guidance for completing this form http://www.nrc.gov/reading-rm/doc-collections/nuregs/staff/sr1022/r3/)

APPROVED BY OMB: NO. 3150-0104 **EXPIRES: 03/31/2020**

Estimated burden per response to comply with this mandatory collection request: 80 hours. Reported lessons learned are incorporated into the licensing process and fed back to industry. Send comments regarding burden estimate to the Information Services Branch (T-2 F43), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by e-mail to Infocollects.Resource@nrc.gov, and to the Desk Officer, Office of Information and Regulatory Affairs, NEOB-10202, (3150-0104), Office of Management and Budget, Washington, DC 20503. If a means used to impose an information collection does not display a currently valid OMB control number, the NRC may not conduct or sponsor, and a person is not required to respond to, the information collection.

1. Facility Name	2. Docket Number	3. Page
PALISADES NUCLEAR PLANT	05000255	1 OF 3

4. Title

Reactor Protection System and Auxiliary Feedwater System Actuation due to Turbine Governor Valve Failure

5. Event Date			6. LER Number			7. Report Date			8. Other Facilities Involved	
Month	Day	Year	Year	Sequential Number	Rev No.	Month	Day	Year	Facility Name	Docket Number
										05000
01	03	2019	2019	- 001	- 00	02	28	2019	Facility Name	Docket Number
										05000

9. Operating Mode	11. This Report is Submitted Pursuant to the Requirements of 10 CFR §: *(Check all that apply)*			
1	☐ 20.2201(b)	☐ 20.2203(a)(3)(i)	☐ 50.73(a)(2)(ii)(A)	☐ 50.73(a)(2)(viii)(A)
	☐ 20.2201(d)	☐ 20.2203(a)(3)(ii)	☐ 50.73(a)(2)(ii)(B)	☐ 50.73(a)(2)(viii)(B)
	☐ 20.2203(a)(1)	☐ 20.2203(a)(4)	☐ 50.73(a)(2)(iii)	☐ 50.73(a)(2)(ix)(A)
	☐ 20.2203(a)(2)(i)	☐ 50.36(c)(1)(i)(A)	☒ 50.73(a)(2)(iv)(A)	☐ 50.73(a)(2)(x)
10. Power Level	☐ 20.2203(a)(2)(ii)	☐ 50.36(c)(1)(ii)(A)	☐ 50.73(a)(2)(v)(A)	☐ 73.71(a)(4)
85	☐ 20.2203(a)(2)(iii)	☐ 50.36(c)(2)	☐ 50.73(a)(2)(v)(B)	☐ 73.71(a)(5)
	☐ 20.2203(a)(2)(iv)	☐ 50.46(a)(3)(ii)	☐ 50.73(a)(2)(v)(C)	☐ 73.77(a)(1)
	☐ 20.2203(a)(2)(v)	☐ 50.73(a)(2)(i)(A)	☐ 50.73(a)(2)(v)(D)	☐ 73.77(a)(2)(ii)
	☐ 20.2203(a)(2)(vi)	☐ 50.73(a)(2)(i)(B)	☐ 50.73(a)(2)(vii)	☐ 73.77(a)(2)(iii)
		☐ 50.73(a)(2)(i)(C)	☐ Other (Specify in Abstract below or in NRC Form 366A	

12. Licensee Contact for this LER

Licensee Contact	Telephone Number (Include Area Code)
Jeffery Hardy, Regulatory Assurance Manager	269-764-2011

13. Complete One Line for each Component Failure Described in this Report

Cause	System	Component	Manufacturer	Reportable To ICES	Cause	System	Component	Manufacturer	Reportable To ICES
X	TA	LCV	W120	Y					

14. Supplemental Report Expected	15. Expected Submission Date	Month	Day	Year
☐ Yes (If yes, complete 15. Expected Submission Date) ☒ No				

Abstract (Limit to 1400 spaces, i.e., approximately 14 single-spaced typewritten lines)

On January 3, 2019, while the reactor was in mode 1 at 85% power, the linear variable differential transformer (LVDT) core on CV-0576, "High Pressure Turbine #4 Governor Valve," broke, causing uncontrolled cycling of the valve and an excursion in generator output. Upon control room notification of the uncontrolled movement of CV-0576, the operators placed the turbine controls in manual operation. However, CV-0576 proceeded to open and close independently of valve controls. Due to the inability to maintain positive control of CV-0576 manually, the operators manually tripped the reactor in accordance with site procedures. The required safety systems and shutdown equipment performed as expected, resulting in an uncomplicated trip. The condition was reported on January 3, 2019 (Event Number 53813) in accordance with 10 CFR 50.72(b)(2)(iv)(B) and 10 CFR 50.72(b)(3)(iv)(A) for a valid reactor protection system (RPS) actuation and an auxiliary feedwater (AFW) actuation.

This condition is reportable in accordance with 10 CFR 50.73(a)(2)(iv)(A) as a condition that resulted in the actuation of both the RPS and the AFW.

The condition was attributed to a high-cycle fatigue failure of the LVDT core, which led to the uncontrolled movement of CV-0576. Corrective actions were taken to replace the LVDT cores on all four governor valves before returning to power operations.

The investigation led to a corrective action to create preventative maintenance tasks to replace the governor valve LVDTs during normally scheduled actuator inspection and refurbishment.

1. FACILITY NAME	2. DOCKET NUMBER	3. LER NUMBER		
		YEAR	SEQUENTIAL NUMBER	REV NO.
PALISADES NUCLEAR PLANT	05000-255	2019	- 001	- 00

EVENT DESCRIPTION

On January 3, 2019, at approximately 1900 EST, the reactor was in mode 1 at 85% power. Power output had been reduced to 85% during the previous shift to support isolation of level control valve [LCV] CV-0605, "Feedwater Heater E-6B Level Control," in order to perform emergent maintenance.

Later that day, at approximately 2009 EST, turbine [TRB] first-stage pressure began rising, ultimately producing a rise in net station electric output. As a result of the increased power output, the operators placed the turbine in runback in an attempt to return power to pre-event levels.

During the turbine runback, CV-0576 was observed to be cycling from what appeared to be 100% open to nearly 50% open within five minutes. The operators placed the turbine controls in manual to prevent any further valve movement. With the turbine controls in manual, CV-0576 proceeded to open and close in a similar manner as previously observed. Due to the inability to maintain positive control of CV-0576 while the digital electro-hydraulic (DEH) controls were in manual, the reactor was manually tripped in accordance with site procedures. The auxiliary feedwater system automatically actuated to recover steam generator level [SG], as designed. The plant was stabilized in a hot shutdown condition.

Troubleshooting identified that the linear variable differential transformer [XFMR] (LVDT) core had broken off the LVDT rod. All four LVDT governor valve cores were replaced. The plant was returned to service on January 5, 2019.

There were no other structures, systems, or components (SSCs) that were inoperable at the time that contributed to the event.

This condition is reportable in accordance with 10 CFR 50.73(a)(2)(iv)(A) as a condition that resulted in a valid actuation of both the reactor protection system and the auxiliary feedwater system.

Energy Industry Identification System (EIIS) codes and component codes are identified in brackets above.

CAUSE OF THE EVENT

Failure of the LVDT core occurred at the threaded interface between the magnetic core and the non-magnetic push rod. The direct cause for the broken LVDT core on CV-0576 was high-cycle fatigue.

ASSESSMENT OF SAFETY CONSEQUENCES

The safety significance of the event was low. The fatigue limit of the threaded connection was reached after many cycles of operation. No specific vendor recommendation exists regarding replacement of the LVDTs. LVDTs are typically replaced as a result of failure to calibrate or physical damage identified by personnel, but not due to fatigue failure concerns.

There were no consequences with regard to the safety of the public, nuclear safety, industrial safety, or radiological safety for this event.

CORRECTIVE ACTIONS

During troubleshooting, it was identified that the LVDT rod had split from the core. All four governor valve cores were replaced prior to plant restart on January 5, 2019.

A preventative maintenance task was created to periodically replace the governor valve LVDTs during future normally scheduled actuator inspection and refurbishment activities.

PREVIOUS OCCURENCES

A review of the Palisades Nuclear Plant (PNP) corrective action program database was completed. No similar events were previously identified involving LVDT core failure.